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ABSTRACT

This study was designed to develop an instrument to measure comprehension of oral-language syntactic structures, to establish the validity and reliability of the instrument, and to determine the nature of the relationship between comprehension of syntactic structures in oral language and reading comprehension. The Comprehension of Selected Oral Language Syntax Test (COSOLST) was administered to 14 first-grade subjects from each of nine schools in Fairfax County, Virginia. The study's finding that comprehension of syntactic structures in oral language was related to reading comprehension may account, in part, for variance in reading comprehension that is not reflected in scores on intelligence tests. The possible uses of the COSOLST are outlined; tabulations of data, an example of picture choices that accompanied written descriptions on the test, a list of the sentences that appeared on the test, a glossary of terms, and a bibliography complete the discussion.
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Comprehension of Syntactic Structures
in Oral Language and Its Relationship
to Reading Comprehension in First-Grade Children

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Oral language facility has repeatedly been suggested as an important base for success in beginning reading. One facet of general language ability that has received particular research attention has been oral language production. The work of Strickland (1962) and Loban (1963, 1970), following a structural linguistic orientation, and the work of Hunt (1965), O'Donnell, Griffin, and Norris (1967), and others, following a transformational linguistic orientation, has yielded evidence supportive of a relationship between oral language ability and reading ability.

Study of the production mode, however, has been criticized for being plagued with situational factors that

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seriously affect the quantity and quality of oral language output that is obtained. According to Cowan, Weber, Hoddinott, and Kléin (1967), it is the comprehension mode that is to be preferred because it is less subject to such situational influences. In this sense, the assessment of an individual's language performance through the comprehension mode is likely to be more indicative of the individual's underlying competence than assessment through the production mode. The comprehension mode would also appear most appropriate in a study relating oral language ability to reading ability because reading is a process involving language comprehension rather than language production.

Traditionally, oral language comprehension, studied in relationship to reading, has been measured globally through listening tests (Brown, 1965; Duker, 1964, 1965;

Jackson, 1966; Toussaint, 1961). Such measures have been faulted for not yielding specific information about which aspects of language comprehension are related to reading success. Consideration of specific language components, especially syntax, has been strongly urged (MacGinitie, 1969, p. 694). Syntax, the bridge between sound and meaning in language, has arisen to a position of importance in language study largely through the work in transformational linguistics (N. Chomsky, 1957, 1965) and is purported to be an important variable in reading research.

Besides approaching oral language comprehension too globally, most of the extant research has had three other limitations. First, the majority of the studies have been conducted with children above the first-grade level. Since reading authorities have consistently claimed that a relationship exists between oral language development and beginning reading success, studies to investigate this

claim would have to be done at the first-grade level where children traditionally experience reading instruction for the first time. At this level, too, children do not have mastery of all the syntactic structures with which adults have proficiency (C. Chomsky, 1969).

An immediate problem in testing first-grade children is that there are no tests available at that level that measure comprehension of oral language syntactic patterns exclusively. Tests such as The Michigan Picture Language Inventory (Lerea, 1958) and the Test for Auditory Comprehension of Language (Carrow, 1973) include a relatively small number of items designed to assess syntactic comprehension, and these items only assess comprehension of a variety of parts of speech rather than syntactic patterns in sentences. The Northwestern Syntax Screening Test (Lee, 1969) is designed to detect the small percentage of 3- to 8-year-old children who are deviant in syntactic

development. Research data indicate that the test items are extremely easy for the majority of first-grade children (Lee, 1970).

Second, reading ability has been most often measured with subtests that do not provide opportunity for the reader to process syntactic cues. To the extent of the investigator's awareness, there are no reading tests that measure specific syntactic abilities with written language in a comprehensive way. At the very least, however, reading tests chosen for studies of this type should involve reading material having syntactic structure, for example subtests of sentence and paragraph meaning rather than subtests of word recognition and word meaning.

Third, there has been a general exclusion of the variable of intelligence which may be operating as a third factor responsible for any correlation between reading ability and oral language syntactic ability. Intelligence

has been found to relate somewhat to comprehension of oral language syntax (C. Chomsky, 1972) and to relate to reading achievement to an even higher degree (Bond & Tinker, 1973).

The Problem

This study was designed to: (a) develop a research instrument appropriate at the first-grade level to measure comprehension of selected oral language syntactic structures---one that considers various transformation types and sentence complexity types, (b) establish the validity and reliability of the instrument, and (c) determine the nature of the relationship between comprehension of syntactic structures in oral language and reading comprehension with and without control of intelligence variables.

Method

Test Development

The Comprehension of Selected Oral Language Syntax

Test (COSOLST), an individually administered test, was developed by the investigator. The test consisted of 36 sentences varying in syntactic structure that are presented orally by an examiner. A child indicates comprehension by pointing to one of four 5x7 inch black-and-white picture choices. Appendix A contains all the sentences on the COSOLST.

Each sentence on the instrument varied along two dimensions: a transformation dimension and, for lack of a better term, a sentence complexity dimension that involved various conjoinings and embeddings. These dimensions were used because both are basic to transformational grammar, and similar dimensional categories have been used in research on oral language development (Gaer, 1967; Menyuk, 1961; Slobin, 1966). Table 1 lists the various transformational types and sentence complexity types that were used and indicates the specific transformation type and complexity

type dually represented by each sentence on the test. For example, item 22 on the COSOLST is a negative-active sentence having a right embedding with an object focus. Definitions helpful in understanding the categories within each dimension are found in Appendix B. It should be noted that both dimensions are made up of categories that involve an increase in complexity from a grammar standpoint, not necessarily from a performance standpoint. Transformational grammar, never intended to be a model of performance, does, however, offer useful ways to conceptualize syntactic patterns. Content validity of the items was established by agreement among three university teachers of transformational grammar; they judged the items representative of the category types purported.

Insert Table 1 about here

One of the considerations maintained in test construction was to minimize certain effects of memory. Syntactic processing inherently involves some memory because a person must keep track of who is doing what to whom. An attempt was made, however, to control undue demands on memory caused by excessively long sentences; each sentence on the test is 10-12 words in length with a few exceptions.

Although it is impossible to develop a completely pure syntax test because syntax is closely intertwined with semantics, an effort was made to minimize semantic involvement. The words used in the items were taken from Rinsland's list (1945) of 3,000 most frequently appearing words in the writing of first-grade children. A pilot study involving 50 first-grade children who were to identify the picture that matched particular words and phrases from the COSOLST, indicated that the first-grade children had no difficulty with the concepts behind the words used nor with the

artistry of the pictures. Prior to the pilot study, the picture choices were submitted to three doctoral students in reading who judged them as being clear and having appropriate distractors. The set of picture choices for one of the test sentences can be seen in Figure 1.

Insert Figure 1 about here

To further minimize semantic involvement, a condition of reversibility, acknowledged as important by Slobin (1966), was maintained in a majority of the sentences. Reversible sentences like The girl is pushing the boy require special attention to the syntax in order to keep straight the actor and the person upon whom the action is done. Non-reversible sentences like The girl is throwing the ball can, on the other hand, be processed largely on the basis of common sense and with little attention to syntax. The sentences

on the COSOLST that did not have reversibility did, however, have nouns in either relative clauses or conjoined parts that could function in the subject position and hence require close attention to syntax. Even though the direct object bicycle cannot be exchanged with the subject girl in the sentence The girl is kicking the bicycle that the boy is painting, the possibility of confusion exists as to whether the girl or the boy is doing the kicking.

Whether the final items were within the realm of adult competence was also considered. Administered to a group of 20 adults, the test sentences were found to be well within the range of adult ability.

A final consideration was the test's reliability. The entire set of items, given to the 50 first-graders in the pilot, yielded a Kuder-Richardson Formula 20 coefficient of .80--reasonable for an instrument that was neither a classroom test nor a standardized test (Gronlund, 1968).

Subjects

The 30 schools in Area I of Fairfax County, Virginia, were categorized according to socio-economic status as judged by the area supervisor of reading. Three schools from among those that were predominantly low in socio-economic status were randomly selected, three from those that were middle SES, and three that were high SES. Within each of the nine schools, 14 subjects were randomly selected from among the first-grade children who (a) had not been retained nor held back a year before entry into school, (b) had no severe hearing loss, (c) did not speak English as a second language, and (d) did not attend special education classes. Due to absences during testing, the final sample included 107 subjects. The subjects were predominantly white, and the age range was 6-7 to 7-7 with the mean being 7-1.

Date Collection

On three different days of testing during the last month of school, each first-grade subject was given (a) Level 1 of the California Short-Form Test of Mental Maturity (CSFTMM) to measure language, non-language, and total intelligence, (b) the Reading subtest of the Primary I level of the Metropolitan Achievement Tests to measure reading comprehension, and (c) the Comprehension of Selected Oral Language Syntax Test (COSOLST) to measure comprehension of selected oral language syntactic structures.

Results

Test Reliability

Table 2 presents descriptive data gathered on the COSOLST and the other two measures used in the study. The COSOLST, having a reliability coefficient of .78 and a standard error of measurement in raw score units of 2.5, appeared to maintain an adequate level of reliability.

Insert Table 2 about here

The reliability of the Metropolitan reading subtest appeared to be adequate while that of the California Short-Form Test of Mental Maturity with this research sample represented some decrease over the values listed in the test manual for the norming sample: .90, .89, .94, respectively.

Adequacy Of COSOLST Dimensions

To determine how adequately the dimension of transformation type and sentence complexity type were functioning, performance data on the COSOLST were analyzed by analysis of variance procedures employing a three-way factorial design. The three factors were: individual subjects themselves (107), transformation type (4 types), and sentence complexity type (9 types). The analysis of variance model that was used was a mixed model (Hays, 1973, pp. 551-559) with transformation type and sentence complexity type as fixed effects and subjects as a random effect. The results are displayed in Table 3. Systematic differences among the

items on the COSOLST were found to be related to sentence complexity type, sentence transformation type, and an interaction between transformation and complexity types.

Insert Table 3 about here

Correlations

Zero-order correlation coefficients using the Pearson product-moment correlation procedure were calculated to determine the nature of the relationship between reading comprehension and comprehension of oral language syntax without control of intelligence. The correlational matrix is found in Table 4. Although not relating as highly to reading comprehension as did intelligence, comprehension of selected oral language syntax did relate to reading comprehension at a significant level. Twenty per cent of the variance in reading comprehension is explained in terms of the variance in comprehension of selected oral language syntax.

Insert Table 4 about here

Partial correlations were computed to determine the relationship between reading comprehension and comprehension of syntactic structures in oral language with control over language IQ, non-language IQ, and total IQ. The correlations were .25, .30, and .24, respectively. Although retaining significance at a .01 level, the correlations were diminished and accounted for only 6% to 9% of the variance.

Assuming that reading comprehension is a function of comprehension of oral language syntax in combination with intelligence, multiple correlations were obtained to determine the nature of the relationship. The correlations with reading comprehension when syntactic ability was combined with language IQ, non-language IQ, and total IQ were .62, .57, and .61, respectively. The correlations, significant at a .01 level, indicate a higher relationship with reading

comprehension when intelligence and oral language syntactic ability are treated in combination than when treated alone.

Difficulty Of Various Syntactic Structures

In the course of data analysis, serendipital information was gathered regarding the difficulty of various sentence type categories on the COSOLST. Table 5 indicates the percentage of subjects getting each item correct as well as the percentage getting various categories correct. Through observation it appears that there was more variation in difficulty along the dimension of sentence complexity type than along the dimension of transformation type. Among the transformation types, the negative-passives were the most difficult while the other three differed little. Among the sentence complexity types, simple and compound sentences were the easiest to comprehend while sentences having a center double embedding were the most difficult. Performance on the other types along the sentence complexity

dimension varied to a small degree. The difficulty with sentences having a center double embedding may have been due to the increased number of embeddings or to the separation of subject and verb. Further clarification may be achieved by studying children who are tested with sentences having multiple center embeddings and sentences having multiple right embeddings.

Insert Table 5 about here

Conclusions And Discussion

Comprehension Of Reading And Oral Language Syntax

The study's finding that comprehension of syntactic structures in oral language was related to reading comprehension is important because the variable of comprehension of oral language syntax offers much more specificity than did general listening comprehension variables. While the correlation of .45 was not outstandingly high and while it

was even further reduced when intelligence was held constant, it did reach statistical significance. Comprehension of selected oral language syntax is accounting for some of the variance in reading comprehension not being accounted for by intelligence. Within the view of reading as a complex of many factors, awareness of factors related to reading comprehension even in a very small way provides some clarifying information.

Intelligence Variable

Intelligence was found to relate very highly to reading comprehension which is not at all surprising (Bond & Tinker, 1967). The finding that intelligence was more highly related to reading comprehension than was comprehension of oral language syntax encourages some speculation. Because intelligence tests traditionally have been designed to predict school achievement and because reading comprehension is one ability that is taught in school, it would stand to

reason that reading comprehension was highly dependent on intelligence. Comprehension of oral language syntactic structures, on the other hand, is not an ability that is consciously taught in school. Any dependency syntactic comprehension may have on intelligence may involve a kind of intelligence not measured by commonly used intelligence tests; comprehension of syntactic structures may not be developed in a manner at all like the way reading comprehension as a school-based process is developed.

The Nature Of Correlations

To answer the questions regarding relationships between variables, correlational procedures were followed. According to McNemar (1962, pp. 136-162), correlations are affected by three conditions: (a) random selection of subjects, which was done in this study, (b) heterogeneity with respect to the traits being correlated, and (c) reliability of the instruments.

With respect to point b, there was substantial variance on the Reading subtest of the Metropolitan and on the CSFTMM. However, the variance on the COSOLST was more restricted and could have had an influence in reducing the size of the correlations between comprehension of selected oral language syntax and other variables. The question arises as to whether level of syntactic development is, in fact, extremely similar among children of first-grade age or whether the relative homogeneity on the COSOLST is an artifact of the types of structures and the specific items included on the COSOLST. Again, the role of intelligence becomes an important question. It is a theoretical question of whether syntactic acquisition is biologically specified and therefore less related to intelligence as intelligence is commonly conceptualized, whether it is learned and therefore more related to intelligence and more variable, or whether it is a combination of the two. Future research

should assess first-grade children's comprehension of other syntactic structures and determine the degree of variation found among children in terms of these specific structures as well as in terms of oral language syntax in general. If there is heterogeneity in syntactic comprehension, it would then be possible to improve the variance on the COSOLST by assessing a broader range of differentially acquired syntactic structures.

With respect to point c, reliability of instruments, the Reading subtest of the Metropolitan was found to be quite high in reliability; the same was not true of the California Short-Form Test of Mental Maturity. Future research may well yield higher correlations if an intelligence test that proves to be more reliable than the CSFTMM is used. The reliability of the COSOLST appeared reasonable although some improvement is possible through a process of item modification and change.

Test validity was also of concern. The instrument used to measure reading comprehension was a subtest of a group standardized test. According to Farr (1969), "group tests of reading achievement are quite limited as valid measures of subskills of reading" (p.85). The problem to which Farr refers is extremely widespread in the area of reading measurement. If and when a group reading test becomes available at the first-grade level that measures reading comprehension exclusively and has demonstrated validity, its use is likely to affect research findings. The use of individual reading tests having sections of reading comprehension of demonstrated validity are also likely to affect future correlational studies.

Value Of The COSOLST

In this study the Comprehension of Selected Oral Language Syntax Test, developed by the investigator, was found to be a reasonably valid and reliable instrument that

has the potential to serve as a useful research tool. The dimensions of transformation type and sentence complexity type appeared to be functioning well in affecting variations in performance on the test.

In terms of the relationship between oral language syntactic comprehension and reading comprehension, future research questions include (a) whether such variables as quality and quantity of children's reading instructional exposure and their picture interpretation ability have an effect on the relationship; (b) through an experimental design, whether the variable of oral language syntax can be trained and whether it has a subsequent effect on reading comprehension; and (c) whether comprehension of oral language syntax has predictive value as a reading readiness factor.

Within the area of oral language development, the instrument has possible use in the study of (a) developmental

differences in syntactic ability among preschoolers and primary level children, (b) the effects of socio-economic level on language ability, and (c) the relationship comprehension of oral language syntax has with other language development factors.

Table 1 Distribution of sentence test items on the
Comprehension of Selected Oral Language Syntax Test^a

	Transformation type			
	Affirmative active	Negative active	Affirmative passive	Negative Passive
Simple (S)	33	34	7	26
Conjoined with No Deletion (C-ND)	17	36	25	23
Conjoined with Deletion (C-D)	29	28	15	2
Has a Right Embedding with Subject Focus (RE-SF)	35	13	19	10
Has a Right Embedding with Object Focus (RE-OF)	4	22	16	30
Has a Center Embedding with Subject Focus (CE-SF)	5	9	8	14
Has a Center Embedding with Object Focus (CE-OF)	12	6	11	31
Has an Appositive Type of Center Embedding (CE-AP)	1	3	24	20
Has a Double Embedding (DE)	21	18	32	27

^a The numbers in the body refer to the numbers of the sentences on the COSOLST as found in Appendix A.

Table 2 Means, standard deviations, and reliability coefficients for the COSOLST, the CSFTMM, and the Metropolitan Reading Subtest

	Mean	Standard Deviation	Reliability ^a
COSOLST ^b	25.5	5.3	.78
CSFTMM			
Language IQ	104.1	11.8	.76
Non-language IQ	108.3	11.7	.81
Total IQ	107.6	12.1	.87
Metropolitan ^c	25.2	10.8	.94

^aBased on Kuder-Richardson Formula 20.

^bMaximum score = 36.

^cMaximum score = 42.

Table 3 Analysis of variance on first-grade students' scores on the COSOLST

Source	S.S.	df	M.S.	F
Subjects (S)	82.911	106	.782	4.88*
Transformation Type (T)	7.195	3	2.398	12.96*
Complex sentence Type (C)	37.444	8	4.680	23.05*
S x T	58.805	318	.185	1.12
S x C	172.444	848	.203	1.25
T x C	25.571	24	1.065	6.62*
S x T x C	417.417	2.544	.164	
Total	801.787	3.851		

* Statistically significant at .01 level.

Table 4 Correlational matrix for comprehension of selected oral language syntax, reading comprehension, and intelligence

Comprehension of selected oral language syntax	Reading Compre- hension	Intelligence		
		Lan- guage	Non- language	Total
Comprehension of selected oral language syntax	1.00	.45*	.46*	.44*
Reading com- prehension	1.00	.58*	.51*	.58*
Language IQ		1.00	.64*	.91*
Non-language IQ			1.00	.89*
Total IQ				1.00

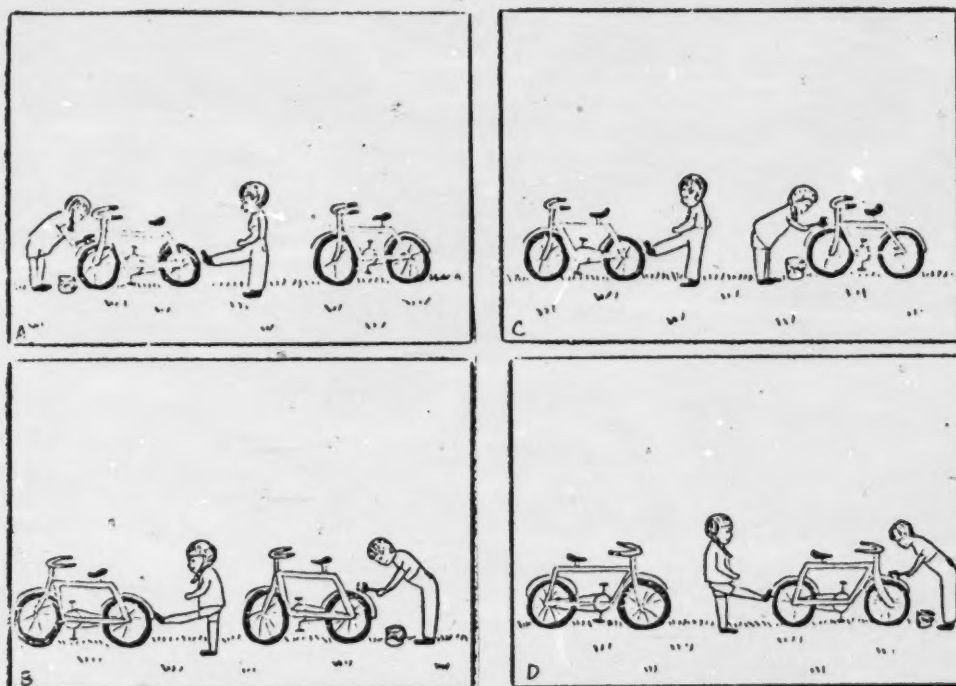
*Statistically significant at .01 level.

Table 5 Difficulty indices for items on the COSOLST

Sentence Complexity type	Transformation type				Total
	Affirmative active	Negative active	Affirmative passive	Negative passive	
S	.90	.92	.90	.77	.87
C-ND	.86	.69	.87	.70	.78
C-D	.82	.71	.76	.69	.74
RE-SF	.64	.82	.56	.68	.68
RE-OF	.78	.83	.70	.50	.70
CE-SF	.66	.77	.72	.69	.71
CE-OF	.73	.63	.73	.75	.71
CE-AP	.67	.82	.64	.54	.67
DE	.61	.29	.64	.36	.48
Total	.74	.72	.73	.63	.70

FIGURE 1

Set of Picture Choices for A Sentence on the COSOLST



Test Item 4. The girl is kicking the bicycle that the boy is painting.

Appendix A: Sentences on the Comprehension of
Selected Oral Language Syntax Test

1. The dog, a puppy, is eating the food in the dish.
2. The boy and the girl are not pulled on the sled by Mother.
3. The man, a policeman, is not riding a horse on the road.
4. The girl is kicking the bicycle that the boy is painting.
5. The boy who is sitting on the fence is calling the girl.
6. The baby the girl is holding is not throwing the ball.
7. The boy is being chased up the hill by the girl.
8. The boy wearing the hat is being pushed by the girl.
9. The girl who has curly hair is not pushing the boy.
10. The girl is not pulled by the boy who is holding the ball.
11. The wagon the girl is pulling is being kicked by the boy.
12. The squirrel that the cat is chasing is climbing the tree.
13. Mother is not watching the rabbit that is sitting on the fence.
14. The cat that has spots is not being chased by the dog.
15. The dog and the cat are chased up the hill by Father.

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16. The flowers are being watered by the baby the girl is holding.
17. The boy is digging a hole, and Mother is picking flowers.
18. The boy holding the monkey wearing a hat is not watching Mother.
19. The baby is watched by the girl who is wearing a hat.
20. The woman, a teacher, is not being called by the boy.
21. The boy who is holding the dog that is barking watches Father.
22. The girl is not painting the box that the man is holding.
23. Books are not held by Father, and flowers are not watered by Mother.
24. The girl, a baby, is being pulled by the boy.
25. Dishes are held by Mother, and apples are eaten by Father.
26. The boy is not being pulled on the sled by the girl.
27. The baby watching the dog eating food is not held by Mother.
28. Father is not pulling the girl and the boy on the horse.
29. The dog is chasing the cat and the rabbit up the hill.
30. The box is not dropped by the girl the boy is pushing.
31. The food the boy holds is not being eaten by the cat.
32. The girl holding the cat that has spots is pushed by Father.

33. The cat is chasing the squirrel up the tree.
34. The boy is not pulling the girl in the wagon.
35. The boy is walking the horse that is wearing a hat.
36. Mother is not watering flowers, and Father is not painting the house.

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Appendix B: Definition of Terms

Affirmative-active sentence is a sentence in which the subject of the transitive verb in the main clause is the actor, and the sentence is stated in a manner indicating truth or assent, e.g., Mary saw the dog.

Affirmative-passive sentence is a sentence in which the subject of the transitive verb in the main clause receives the action, and the sentence is stated in a manner indicating truth or assent, e.g., The wagon is pulled by the boy.

Appositive is the nonrestrictive relative clause inserted within a main clause. The words in the relative clause other than the noun phrase can be deleted, e.g., a clown in the sentence The man, a clown, performed for us.

Center embedding is a relative clause the antecedent noun of which is the subject of the main clause, that the mouse saw in the sentence The cat that the mouse saw is climbing a tree.

Complex sentence is a sentence that is the result of a combination of simple sentences.

Conjoined sentence is a complex sentence that is the result of two simple sentences being combined as equals, e.g., Joe can skate and Mary can skate, which can be further reduced to Joe and Mary can skate.

Double embedding is defined as two relative clauses that have been inserted in the main clause, e.g., who is patting the dog that is eating in the sentence Father sees the boy who is patting the dog that is eating.

This example contains a center double embedding.

Embedding is a clause that is inserted as a constituent within a main clause, e.g., The man who is wearing a hat spoke to me is made up of the embedded constituent who is wearing a hat which is inserted in the main clause The man spoke to me.

Negative-active sentence is a sentence in which the subject of the transitive verb in the main clause is the actor, and the sentence is stated in a manner indicating denial. In the Comprehension of Selected Oral Language Syntax Test the negative-actives have the word not preceding the main verb, e.g., She is not waiting for her dog.

Negative-passive sentence is a sentence in which the subject of the transitive verb in the main clause receives the action, and the sentence is stated in a manner indicating denial. In the Comprehension of Selected Oral Language Syntax Test the negative-passive sentences have the word not preceding the main verb, e.g., The book is not being put on the table.

Nonrestrictive relative clause is a relative clause that adds more information about the noun phrase that it modifies. The nonrestrictive relative clause is in apposition to the noun phrase and is set off by commas

in writing and by a slight pause in speech, e.g., the clause which had 130 pages in the sentence She opened the book, which had 130 pages.

Relative clause is a constituent clause that modifies a noun in the main clause of a sentence, e.g., in the sentence He played with the girl who has the toys, the relative clause is who has the toys.

Relative clause with object focus is a relative clause in which the relative pronoun, whether stated or unstated, is in the object position of that clause, e.g., the clause the girl is holding in the sentence The baby the girl is holding is not throwing the ball.

Relative clause with subject focus is a relative clause in which the relative pronoun, whether stated or unstated, is in the subject position of that clause, e.g., the clause who is sitting on the fence in the sentence The girl who is sitting on the fence does not see the cat.

Restrictive relative clause is a relative clause that identifies the noun phrase that it modifies as one among many, e.g., the clause which she liked best in the sentence She opened the book which she liked best.

Right embedding is a relative clause the antecedent noun of which is a direct object or an object of the preposition in the main clause, e.g., The boy is talking to the girl who is wearing a hat.

Simple sentence is a sentence containing only one verb marked for tense, e.g., He walked to the store.

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